

REMARKS

The Office Action dated October 5, 2005, has been received and reviewed.

Claims 1-31 are currently pending and under consideration in the above-referenced application. Each of claims 1-31 stands rejected.

Claims 2 has been canceled without prejudice or disclaimer.

Reconsideration of the above-referenced application is respectfully requested.

Obviousness-Type Double Patenting Rejections

Claims 1-31 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-21 of U.S. Patent 6,899,607.

Claims 1-31 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-32 of co-pending Application 11/068,666.

Claims 1-31 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-24 of co-pending Application 11/128,144.

An obviousness-type double patenting rejection is appropriate where the subject matter recited in a claim is merely an obvious variation of the invention recited in a claim of an issued or patent or pending patent application. M.P.E.P. § 804.

A double patenting rejection of the obviousness-type is ‘analogous to [a failure to meet] the nonobviousness requirement of 35 U.S.C. 103’ except that the patent principally underlying the double patenting rejection is not considered prior art. *In re Braithwaite*, 379 F.2d 594, 154 USPQ 29 (CCPA 1967).

Therefore, any analysis employed in an obviousness-type double patenting rejection parallels the guidelines for analysis of a 35 U.S.C. 103 obviousness determination. *In re Braat*, 937 F.2d 589, 19 USPQ2d 1289 (Fed. Cir. 1991); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985). M.P.E.P. § 804.

A terminal disclaimer and the appropriate fee are being filed herewith, in compliance with 37 C.F.R. § 1.321(b) and (c), to obviate the obviousness-type double patenting rejections, thereby expediting prosecution of the above-referenced application and avoiding further expense and time delay. The filing of a terminal disclaimer in the above-referenced application should

not be construed as acquiescence on the propriety of the obviousness-type double patenting rejections.

Rejections under 35 U.S.C. § 102

Claims 1-15 stand rejected under 35 U.S.C. § 102(e).

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

With respect to inherency, M.P.E.P. § 2112 provides:

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) . . . ‘To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill . . .’’ *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1991).

Williams

Claim 1 stands rejected under 35 U.S.C. § 102(e) for reciting subject matter which is allegedly anticipated by the subject matter described in U.S. Patent 6,594,542 to Williams (hereinafter “Williams”).

Williams describes a method for controlling material removal rates during chemical-mechanical polishing (CMP) processes. Col. 1, lines 15-19. The method that are described in Williams compensate for inconsistencies in a polishing pad over time, from wafer-to-wafer. Col. 5, lines 17-20. In the method of Williams, a thickness of a wafer 102 is measured prior to polishing a material layer, or film, on the wafer. Col. 6, lines 18-20; FIG. 6. A polishing apparatus 200 polishes the material layer for a predetermined time, during which the pressure “applied by the wafer 102 against the polishing surface 206 is measured and controlled

through sensors" on the polishing apparatus. Col. 6, lines 41-47; FIG. 6. After polishing for the predetermined time, an "after polishing" thickness measurement of the wafer 102 is made. Col. 6, lines 53-55. The "before" and "after" thickness measurements are used to calculate a linear estimation factor based on the material removal rate, which is used to adjust the polishing time. Col. 6, lines 55-60. The calculated linear estimation factor, which is based on the measured material removal rates of one or more prior acts of polishing, is used to adjust the durations for which other wafers are subsequently polished so that the polishing pad may be used to remove the same thickness of material from the other wafers. Col. 6, lines 59-62.

Williams does not anticipate each and every element of amended independent claim 1, either expressly or inherently. For example, Williams does not expressly or inherently describe a method that includes biasing independently movable pressurization structures to selectively apply a plurality of different amounts of pressure to different, selected locations of a backside of the semiconductor device structure.

Therefore, under 35 U.S.C. § 102(e), the subject matter recited in amended independent claim 1 is allowable over the subject matter described in Williams.

Sommer

Claims 1-15 stand rejected under 35 U.S.C. § 102(e) for reciting subject matter which is purportedly anticipated by that described in U.S. Patent 6,561,871 to Sommer (hereinafter "Sommer").

Sommer discloses a linear drive mechanism for CMP. Col. 3, lines 53-56. A substrate carrier 402 carries a substrate (not shown) against a polishing surface of CMP apparatus. Col. 12, lines 8-11; FIG. 11. The carrier plate 402 has several magnets 420, 422, 424, and 426 that provide an attractive force F in the Z direction between the carrier plate 402 and the polishing plate 406. Col. 28-30; FIGS. 11, 13. Alternatively, the magnets 520, 522, 524, and 526 may be permanently mounted in the platen 531. Col. 15, lines 47-53; FIG. 15.

While the magnets described in Sommer include protruding regions, the protruding regions appear to have fixed heights. *See, e.g.*, col. 12, lines 23-40; FIGS. 12, 14, and 16. Moreover, it does not appear that the protruding regions of the magnets described in Sommer

may be moved independently from one another. *See, e.g., id.* Nor does Sommer expressly or inherently describe any other structures that may be independently moved to selectively apply different amounts of pressure to different locations on the back side of a semiconductor device substrate.

As Sommer does not expressly or inherently describe an apparatus with elements that are independently movable with respect to each other, Sommer does not expressly or inherently describe a method that includes biasing independently movable pressurization structures to selectively apply a plurality of different amounts of pressure to different, selected locations of a backside of the semiconductor device structure.

Therefore, under 35 U.S.C. § 102(e), the subject matter to which amended independent claim 1 is directed is allowable over the subject matter described in Sommer.

Each of claims 2-15 is allowable, among other reasons, for depending directly or indirectly from allowable independent claim 1.

Claim 3 is additionally allowable because Sommer does not expressly or inherently describe a method that includes magnetically biasing at least one independently movable pressurization structure. Rather, the magnets of Sommer move, if at all, through the use of a motor 491 and screw drive 494. Col. 15, lines 14-15; FIG. 17.

Claim 4 is additionally allowable because Sommer includes no express or inherent description of a method that includes magnetically repelling at least one independently movable pressurization structure.

Claim 5 is additionally allowable because Sommer includes no express or inherent description of a method that includes magnetically attracting at least one independently movable pressurization structure.

Claim 6 is additionally allowable because Sommer lacks any express or inherent description of a method that includes resiliently biasing at least one independently movable pressurization structure.

Claim 7 is additionally allowable because Sommer neither expressly nor inherently describes a method that includes selectively applying a negative pressure to at least one independently movable pressurization structure.

Claim 8 is additionally allowable because Sommer neither expressly nor inherently describes a method that includes selectively applying a selected amount of positive pressure to at least one independently movable pressurization structure.

Claim 10 is additionally allowable because Sommer lacks any express or inherent description of a method that includes biasing and polishing or planarizing to effect the formation of a substantially planar surface.

Claim 11 is additionally allowable because Sommer does not expressly or inherently describe a method that includes locating at least one raised area on an active surface of the semiconductor device structure.

Claims 12 and 13 are additionally allowable because Sommer neither expressly nor inherently describes a method that includes applying a plurality of different amounts of pressure to the backside of a semiconductor device structure or another semiconductor device structure of the same type, respectively, opposite a raised area of the semiconductor device so as to planarize the active surface.

Claim 15 is additionally allowable because Sommer include no express or inherent description of a method that includes substantially simultaneously applying different amounts of pressure to the backside of a semiconductor device structure.

Chen

Claims 1-15 stand rejected under 35 U.S.C. § 102(e) for reciting subject matter which is purportedly anticipated by that described in U.S. Patent 6,436,828 to Chen, *et al.* (hereinafter “Chen”).

Chen discloses a method for polishing a surface of a substrate while using magnets to control the pressure applied to different portions of the substrate. Col. 2, lines 47-52. The method includes a carrier head 100 that supports a flexible membrane 104, or circular sheet, that includes magnetically sensitive particles distributed therein. Col. 4, lines 26-32, 45-48; FIG. 2. The carrier head also includes three coils, 108, 110, and 112, that are coupled to voltage sources 140, 142, and 144. Col. 4, lines 28-31; Col. 5, lines 38-42; FIG. 2. The voltage applied to a coil creates an electrical current, which in turn induces a magnetic field proportional in

intensity to the current flowing through the coil. Col. 5, liens 42-46. The head 100 also includes a pressure chamber that applies a downward load to the membrane 104. Col. 4, lines 63-67; FIG. 2.

In application, the electric current flowing through the coils 108, 110, and 112 induces a magnetic field that interacts with the magnetic particles 118 in the membrane 104. The magnetic field “create[s] a primary field region in a ...first region of the flexible membrane [104] and a secondary field region ...in a second region of the flexible membrane...” Col. 5, lines 49-55. As one example, activating the third coil 112 “will apply the primary magnetic field to at least the central, intermediate and outer membrane portions 132, 134 and 136.” Col. 5, lines 65-67; FIG. 2. Stated differently, the magnetic fields generated in the method of Chen act across the entire membrane 104 such that the resultant effect in one region of membrane 104 (e.g., 132, 134, and 136) depends in part on the resultant effect in adjacent regions of membrane 104. Chen demonstrates this interdependence in FIG. 4, which graphs the removal rate of a material at various radial positions of a substrate under differing magnetic fields. Col. 6, lines 32-67; Col. 7, lines 1-15; FIG. 4.

Chen does not expressly or inherently describe a method that includes biasing a plurality of independently movable pressurization structures to selectively apply a plurality of different amounts of pressure to different, selected locations of a backside of the semiconductor device structure. The membrane of Chen, as discussed above, is a singular sheet with magnetic particles that interact with the magnetic field rather than a plurality of independently movable pressurization structures.

Therefore, under 35 U.S.C. § 102(e), the subject matter to which amended independent claim 1 is drawn is allowable over the subject matter described in Chen.

Claim 3 is additionally allowable because Chen does not expressly or inherently describe a method that includes magnetically biasing at least one independently movable pressurization structure. As discussed above, Chen employs a singular membrane rather than independently movable pressurization structures..

Claim 4 is additionally allowable because Chen includes no express or inherent description of a method that includes magnetically repelling at least one independently movable pressurization structure.

Claim 5 is additionally allowable because Chen includes no express or inherent description of a method that includes magnetically attracting at least one independently movable pressurization structure.

Claim 7 is additionally allowable because Chen neither expressly nor inherently describes a method that includes selectively applying a negative pressure to at least one independently movable pressurization structure.

Claim 8 is additionally allowable because Chen neither expressly nor inherently describes a method that includes selectively applying a selected amount of positive pressure to at least one independently movable pressurization structure.

Claim 11 is additionally allowable because Chen does not expressly or inherently describe a method that includes locating at least one raised area on an active surface of the semiconductor device structure.

It is respectfully requested that the 35 U.S.C. § 102(e) rejections of claims 1-15 be withdrawn.

Rejections under 35 U.S.C. § 103(a)

Claims 16 -31 stand rejected under 35 U.S.C. § 103(a).

The standard for establishing and maintaining a rejection under 35 U.S.C. § 103(a) is set forth in M.P.E.P. § 706.02(j), which provides:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both

be found in the prior art, and not based on applicant's disclosure.
In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Sommer or Chen in View of Williams

Claims 16-31 stand rejected under 35 U.S.C. § 103(a) for reciting subject matter which is assertedly unpatentable over teachings from Sommer or Chen, in view of the subject matter taught in Williams.

Neither Chen nor Sommer, in view of Williams, as set forth above, teaches or suggests all the limitations of independent claim 16. For example, none of these references teaches or suggests a method that includes locating a raised areas on a first semiconductor device structure following polishing at least one layer of the first semiconductor device structure. As discussed above, Williams merely teaches measuring the thickness of a wafer as part of a process to calculate the material removal rate. Williams, Col. 6, lines 53-58; FIG. 1. Chen and Sommer also lack any teaching or suggestion of a method that includes locating raised areas following polishing.

In addition, none of Chen, Sommer, or Williams teaches or suggests a method of selectively applying pressure to the backside of a second semiconductor device structure at locations beneath the second semiconductor device that correspond to the raised areas of the first semiconductor device. Williams, as discussed, modifies the polishing time for subsequent wafers, not the pressure applied to the wafer. Williams, Col. 4, lines 57-58; Col. 5, lines 1-2, 33-34, 50-52; Col. 6, lines 59-60.

Therefore, no combination of teachings from Chen, Sommer, and Williams supports a *prima facie* case of obviousness against independent claim 16 under 35 U.S.C. § 103(a). As such, under 35 U.S.C. § 103(a), the subject matter recited in independent claim 16 is allowable over the subject matter taught in Chen, Sommer, and Williams.

Each of claims 17-31 is allowable, among other reasons, for depending directly or indirectly from claim 16, which is allowable.

Claim 17 is additionally allowable because none of Chen, Sommer, or Williams teaches or suggests a method that includes employing metrology techniques to locate raised areas.

Claim 18 is additionally allowable because none of Chen, Sommer, or Williams teaches or suggests a method that includes applying a sufficient amount of pressure at each of the locations that corresponds to a raised area to form a substantially planar surface on the at least one second semiconductor device structure.

Claim 19 is additionally allowable because none of Chen, Sommer, or Williams teaches or suggests a method that includes selectively applying different amounts of pressure at different ones of the locations that correspond to raised areas.

Claim 20 is additionally allowable because none of Chen, Sommer, or Williams teaches or suggests a method that includes determining an appropriate amount of pressure to apply to each of the locations based on a height of each corresponding raised area.

Claim 25 is additionally allowable because none of Chen, Sommer, or Williams teaches or suggests a method that includes biasing at least one pressurization structure against the backside of the at least one second semiconductor device structure after a first semiconductor device structure has been polished and any raised areas thereon have been located.

Withdrawal of the 35 U.S.C. § 103(a) rejections of claims 16-31 is respectfully requested.

CONCLUSION

It is respectfully submitted that each of claims 1 and 3-31 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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